June 18, 2015

formerly ZymaX Forensics

Jenny DeBoer
Stantec Consulting Services, Inc.
1060 Andrew Drive, Ste. 140
West Chester, PA 19380

RE: Evergreen, Marcus Hook AOI1
Project Number: 213402493

Pace Analytical received 2 sample(s) received on April 17th, 2015 for analysis labeled MW-523 and Seep-A. Per client request, the following analyses were performed:

1. C3-C36 (ASTM 3328)
2. Bromine
3. Sulfur
4. Specific Gravity

The sample was performed in house under laboratory number **15714**.

Please call the lab at 412-660-0256, or you may email any questions or concerns to taryn.mancine@pacelabs.com regarding any analytical data reports.

Respectfully submitted,

Taryn Mancine

Taryn Mancine
Project Manager/Scientist

Pace Analytical
www.pacelabs.com

15714

CHAIN-OF-CUSTODY / Analytical Request Document

The Chain-of-Custody is a LEGAL DOCUMENT. All relevant fields must be completed accurately.

Page: 1 of 1

Section A Required Client Information:		Section B Required Project Information:		Section C Invoice Information:	
Company:	Stantec Consulting Services, Inc	Report To:	Jennifer.Menges@stantec.com	Attention:	
Address:	1060 Andrew Drive, Suite 140	Copy To:	Chris.McCardell@stantec.com	Company Name:	
	West Chester, PA 19380		Jenny.DeBoer@stantec.com	Address:	
Email To:	Jenny.DeBoer@stantec.com	Purchase Order No.:		Pace Quote Reference:	
Phone:	610-250-2500 Fax: 610-840-2501	Project Name:	Evergreen, Marcus Hook AOI 1	Pace Project Manager:	
Requested Due Date/TAT:	Standard	Project Number:	213402493	Pace Profile #:	

REGULATORY AGENCY

☐ NPDES ☐ GROUND WATER ☐ DRINKING WATER

☐ UST ☐ RCRA ☐ OTHER _____

Site Location STATE: PA

Requested Analysis Filtered (Y/N)

ITEM #	Section D Required Client Information — SAMPLE ID (A-Z, 0-9 / ,-) Sample IDs MUST BE UNIQUE	Valid Matrix Codes: MATRIX / CODE — DRINKING WATER DW; WATER WT; WASTE WATER WW; PRODUCT P; SOIL/SOLID SL; OIL OL; WIPE WP; AIR AR; OTHER OT; TISSUE TS	MATRIX CODE (see valid codes to left)	SAMPLE TYPE (G=GRAB C=COMP)	COLLECTED: COMPOSITE START DATE	COMPOSITE START TIME	COMPOSITE END/GRAB DATE	COMPOSITE END/GRAB TIME	SAMPLE TEMP AT COLLECTION	# OF CONTAINERS	Preservatives: Unpreserved	H_2SO_4	HNO_3	HCl	NaOH	$Na_2S_2O_3$	Methanol	Other	Y/N	Analysis Test: C3-C36 (ASTM D3328)	Bromine	Sulfur	Specific Gravity	Residual Chlorine (Y/N)	Pace Project No./ Lab I.D.
1	MW-523		P	G	4/6/15	16:15				1	1									x	x	x	x		43953-1
2	Seep-A		P	G	4/6/15	14:15				1	1									x	x	x	x		43953-2
3																									
4																									
5																									
6																									
7																									
8																									
9																									
10																									
11																									
12																									

ADDITIONAL COMMENTS	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME	SAMPLE CONDITIONS: Temp in °C	Received on Ice (Y/N)	Custody Sealed Cooler (Y/N)	Samples Intact (Y/N)
Please report product identification (and relative proportions), degree of weathering, age information and any other intrepretive information available from the requested analyses. Questions can be directed to Jenny DeBoer (cell 610-209-2511).	DeBoer	4/13/15	1400		4/13/15	1400				
		4/13/15	1700	Scott Quentin Pace	4-14-15	0955	5.6	Y	N	Y
Hold additional volume for possible additional analyses.	Pace	4/15/15	1415		9/17/15	8:25				
		4-17-15	9:40	PASS	4.17.15	0940	1.2	Y	N	

SAMPLER NAME AND SIGNATURE

PRINT Name of SAMPLER: Jenny DeBoer

SIGNATURE of SAMPLER: DeBoer DATE Signed (MM/DD/YY): 4/13/15

*Important Note: By signing this form you are accepting Pace's NET 30 day payment terms and agreeing to late charges of 1.5% per month for any invoices not paid within 30 days.

6/10/2015

ZymaX ID	15714-1
Sample ID	MW-523

Evaporation

n-Pentane / n-Heptane	0.00
2-Methylpentane / 2-Methylheptane	0.00

Waterwashing

Benzene / Cyclohexane	0.00
Toluene / Methylcyclohexane	1.04
Aromatics / Total Paraffins (n+iso+cyc)	28.42
Aromatics / Naphthenes	142.97

Biodegradation

(C4 - C8 Para + Isopara) / C4 - C8 Olefins	0.00
3-Methylhexane / n-Heptane	0.00
Methylcyclohexane / n-Heptane	0.00
Isoparaffins + Naphthenes / Paraffins	3.43

Octane rating

2,2,4,-Trimethylpentane / Methylcyclohexane	0.00

Relative percentages - Bulk hydrocarbon composition as PIANO

% Paraffinic	0.77
% Isoparaffinic	1.95
% Aromatic	96.45
% Naphthenic	0.67
% Olefinic	0.16

6/10/2015

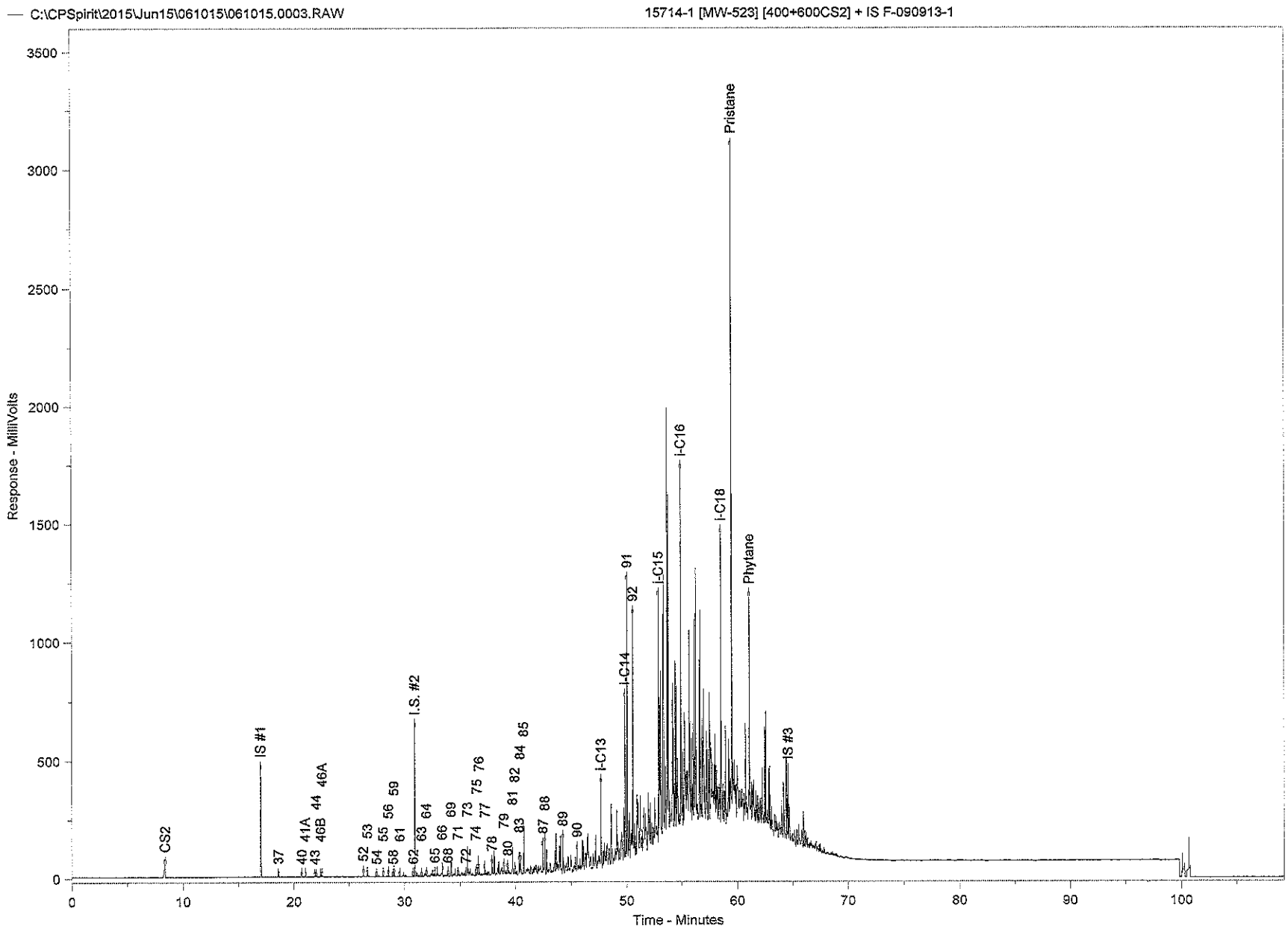
ZymaX ID		15714-1
Sample ID		MW-523
		Relative Area %
1	Propane	0.00
2	Isobutane	0.00
3	Isobutene	0.00
4	Butane/Methanol	0.00
5	trans-2-Butene	0.00
6	cis-2-Butene	0.00
7	3-Methyl-1-butene	0.00
8	Isopentane	0.00
9	1-Pentene	0.00
10	2-Methyl-1-butene	0.00
11	Pentane	0.00
12	trans-2-Pentene	0.00
13	cis-2-Pentene/t-Butanol	0.00
14	2-Methyl-2-butene	0.00
15	2,2-Dimethylbutane	0.00
16	Cyclopentane	0.00
17	2,3-Dimethylbutane/MTBE	0.00
18	2-Methylpentane	0.00
19	3-Methylpentane	0.00
20	Hexane	0.00
21	trans-2-Hexene	0.00
22	3-Methylcyclopentene	0.00
23	3-Methyl-2-pentene	0.00
24	cis-2-Hexene	0.00
25	3-Methyl-trans-2-pentene	0.00
26	Methylcyclopentane	0.00
27	2,4-Dimethylpentane	0.00
28	Benzene	0.00
29	5-Methyl-1-hexene	0.00
30	Cyclohexane	0.00
31	2-Methylhexane/TAME	0.00
32	2,3-Dimethylpentane	0.00
33	3-Methylhexane	0.00
34A	1-trans-3-Dimethylcyclopentane	0.00
34B	1-cis-3-Dimethylcyclopentane	0.00
35	2,2,4-Trimethylpentane	0.00
I.S. #1	à,à,à-Trifluorotoluene	0.00

6/10/2015

ZymaX ID		15714-1
Sample ID		MW-523
		Relative Area %
36	n-Heptane	0.00
37	Methylcyclohexane	0.13
38	2,5-Dimethylhexane	0.00
39	2,4-Dimethylhexane	0.00
40	2,3,4-Trimethylpentane	0.13
41	Toluene/2,3,3-Trimethylpentane	0.14
42	2,3-Dimethylhexane	0.00
43	2-Methylheptane	0.09
44	4-Methylheptane	0.04
45	3,4-Dimethylhexane	0.00
46A	3-Ethyl-3-methylpentane	0.15
46B	1,4-Dimethylcyclohexane	0.11
47	3-Methylheptane	0.00
48	2,2,5-Trimethylhexane	0.00
49	n-Octane	0.00
50	2,2-Dimethylheptane	0.00
51	2,4-Dimethylheptane	0.00
52	Ethylcyclohexane	0.44
53	2,6-Dimethylheptane	0.18
54	Ethylbenzene	0.15
55	m+p Xylenes	0.21
56	4-Methyloctane	0.28
57	2-Methyloctane	0.00
58	3-Ethylheptane	0.07
59	3-Methyloctane	0.35
60	o-Xylene	0.00
61	1-Nonene	0.16
62	n-Nonane	0.14
I.S.#2	p-Bromofluorobenzene	0.00
63	Isopropylbenzene	0.07
64	3,3,5-Trimethylheptane	0.28
65	2,4,5-Trimethylheptane	0.21
66	n-Propylbenzene	1.26
67	1-Methyl-3-ethylbenzene	0.00
68	1-Methyl-4-ethylbenzene	0.35
69	1,3,5-Trimethylbenzene	1.56
70	3,3,4-Trimethylheptane	0.00

6/10/2015

ZymaX ID		15714-1
Sample ID		MW-523
		Relative Area %
71	1-Methyl-2-ethylbenzene	0.26
72	3-Methylnonane	0.16
73	1,2,4-Trimethylbenzene	2.18
74	Isobutylbenzene	0.30
75	sec-Butylbenzene	0.33
76	n-Decane	0.63
77	1,2,3-Trimethylbenzene	0.75
78	Indan	2.02
79	1,3-Diethylbenzene	1.69
80	1,4-Diethylbenzene	0.67
81	n-Butylbenzene	2.19
82	1,3-Dimethyl-5-ethylbenzene	0.76
83	1,4-Dimethyl-2-ethylbenzene	1.96
84	1,3-Dimethyl-4-ethylbenzene	2.46
85	1,2-Dimethyl-4-ethylbenzene	4.64
86	Undecene	0.00
87	1,2,4,5-Tetramethylbenzene	3.21
88	1,2,3,5-Tetramethylbenzene	3.54
89	1,2,3,4-Tetramethylbenzene	4.14
90	Naphthalene	3.09
91	2-Methyl-naphthalene	31.01
92	1-Methyl-naphthalene	27.53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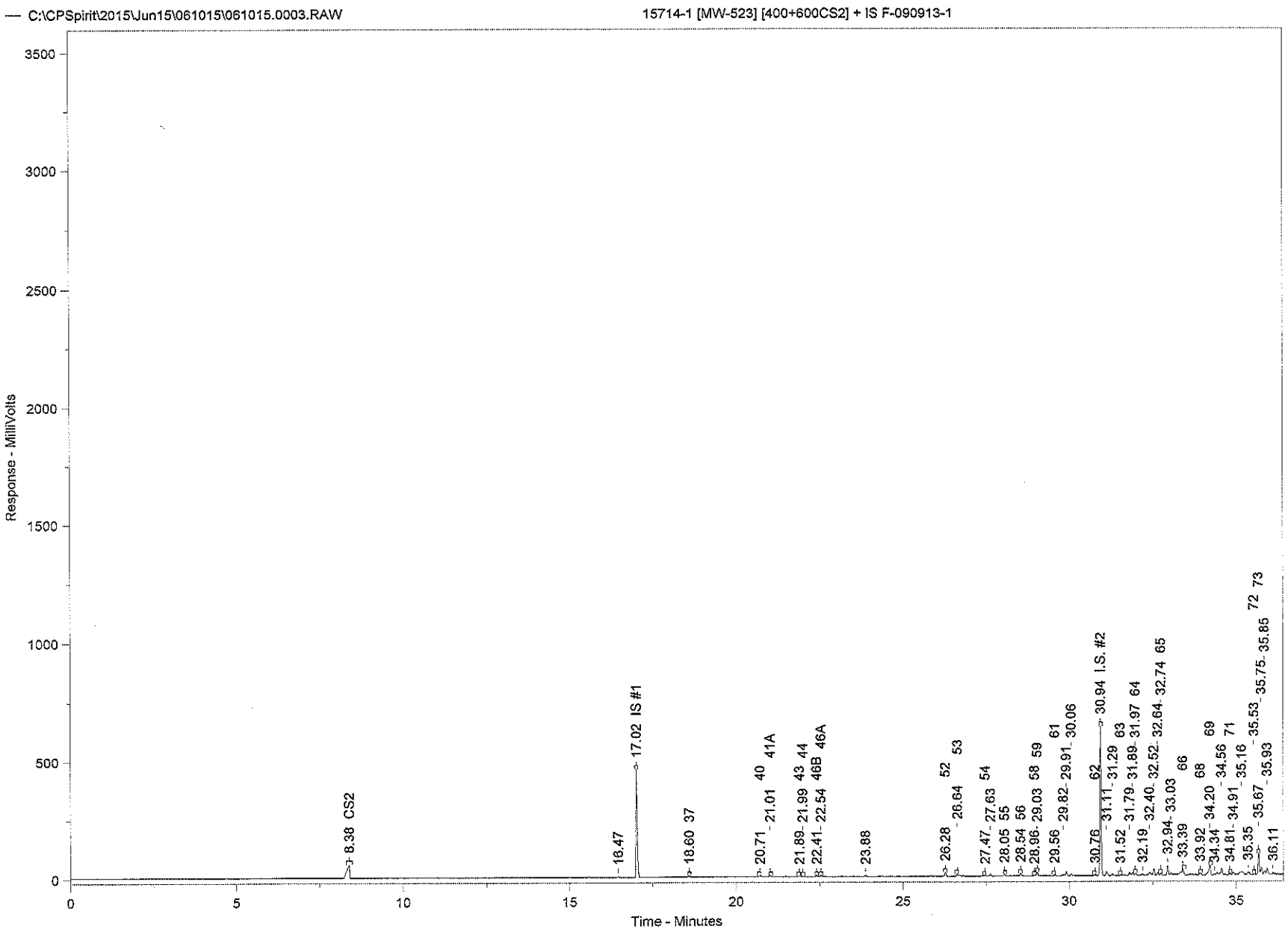
15714-1 [MW-523] [400+600CS2] + IS F-090913-1
Response - MilliVolts
Time - Minutes
CS2
IS #1
I.S. #2
IS #3
Pristane
Phytane
i-C13
i-C14
i-C15
i-C16
i-C18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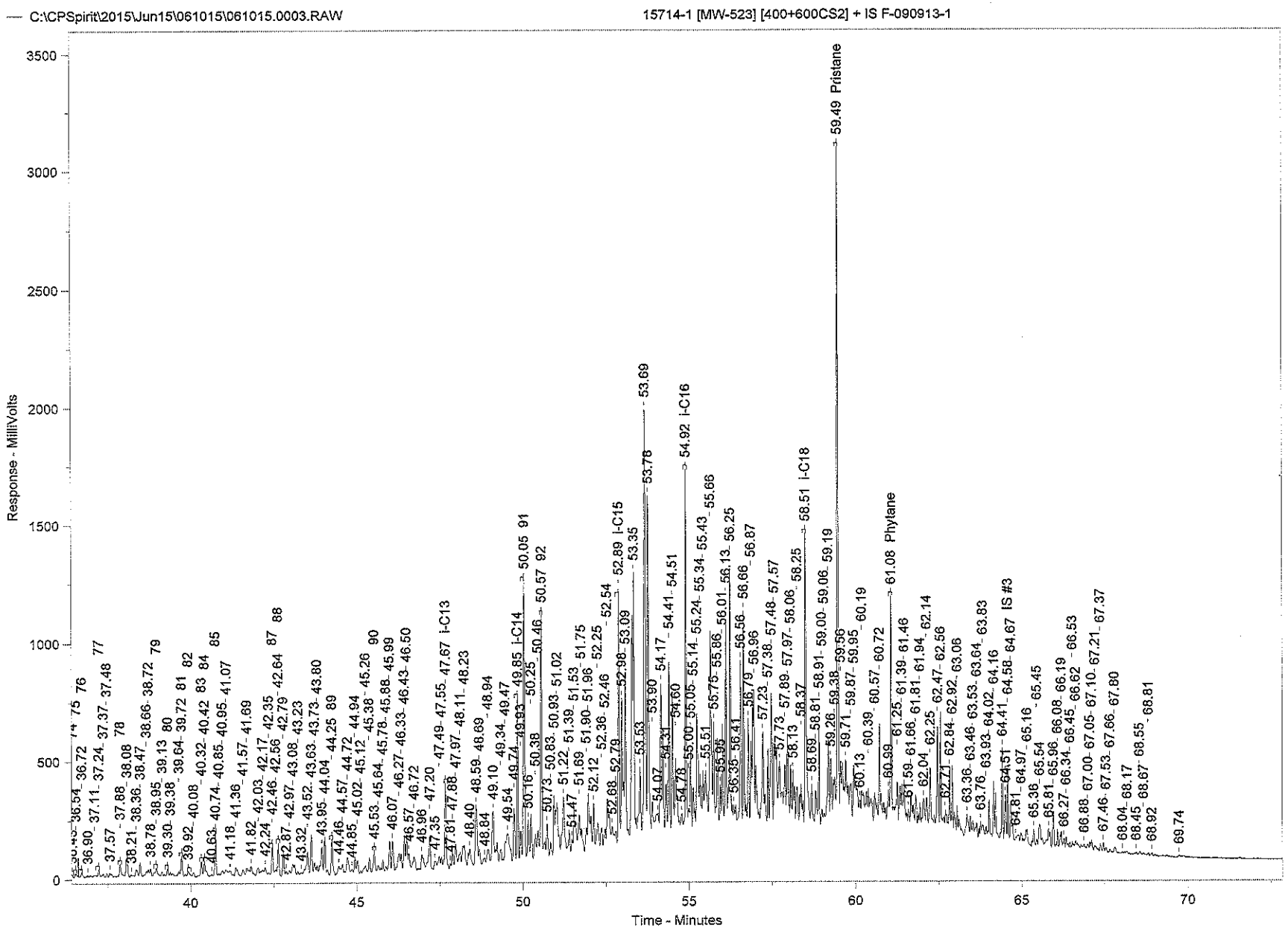
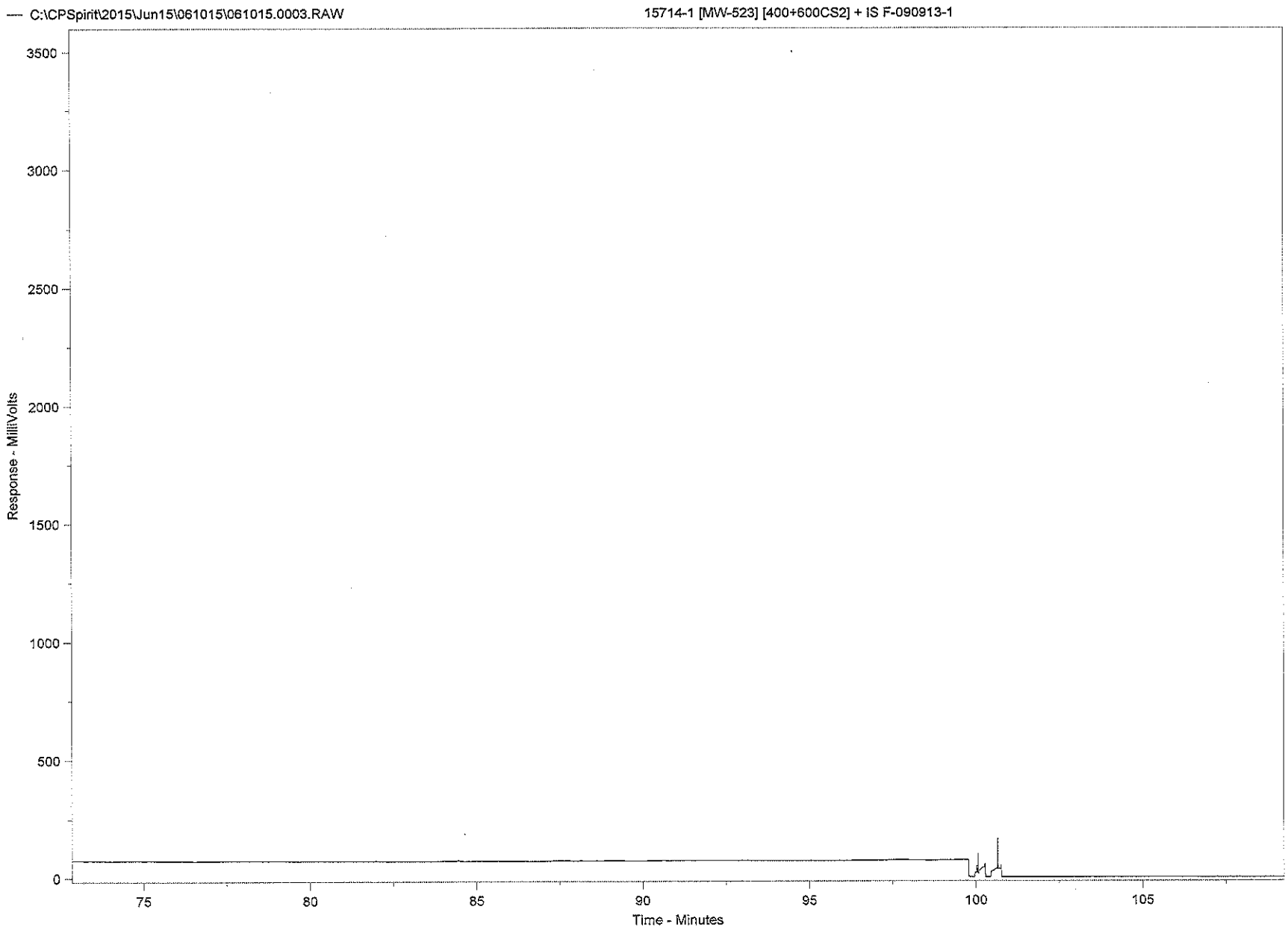
15714-1 [MW-523] [400+600CS2] + IS F-090913-1
Response - MilliVolts
Time - Minutes
8.38 CS2
16.47
17.02 IS #1
18.60 37
20.71
21.01 40 41A
21.89
21.99 43 44
22.41
22.54 46B 46A
23.88
26.28
26.64 52 53
27.47
27.63 54
28.05 55
28.54
28.96
29.03 56 58 59
29.56
29.82
29.91 61 30.06
30.76
30.94 I.S. #2 62
31.11
31.29 63
31.52
31.79
31.89 31.97 64
32.19
32.40
32.52 32.64 65
32.74
32.94
33.03 66
33.39
33.92 68
34.20
34.34 69
34.56
34.81
34.91 71
35.16
35.35
35.53
35.67
35.75
35.85 72 73
35.93
36.11


C:\CPSpirit\2015\Jun15\061015\061015.0003.RAW
15714-1 [MW-523] [400+600CS2] + IS F-090913-1
Response - MilliVolts
Time - Minutes
59.49 Pristane
61.08 Phytane
54.92 i-C16
53.69
53.78
52.89 i-C15
58.51 i-C18
IS #3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15714-1 [MW-523] [400+600CS2] + IS F-090913-1
Response - MilliVolts
3500
3000
2500
2000
1500
1000
500
0
75
80
85
90
95
100
105
Time - Minutes

Sample Name = 15714-1 [MW-523] [400+600CS2] + IS F-090913-1

Instrument = Instrument 1
Heading 1 =
Heading 2 =

Acquisition Port = DP#

Raw File Name = C:\CPSpirit\2015\Jun15\061015\061015.0003.RAW
Method File Name = C:\CPSpirit\C344.met
Calibration File Name = C:\CPSpirit\061615.cal

Date Taken (end) = 6/12/2015 12:05:50 PM
Method Version = 44
Calibration Version = 3

Peak Name	Ret. Time	Area %	Area
CS2	8.38	0.1334	331947.20
	16.47	0.0045	11207.27
IS #1	17.02	0.4610	1147295.00
37	18.60	0.0061	15248.67
40	20.71	0.0060	15026.83
41A	21.01	0.0064	15851.83
43	21.89	0.0044	11046.62
44	21.99	0.0020	4950.42
46B	22.41	0.0050	12524.22
46A	22.54	0.0070	17488.86
	23.88	0.0044	10950.97
52	26.28	0.0203	50440.07
53	26.64	0.0086	21455.00
54	27.47	0.0070	17543.43
	27.63	0.0091	22766.26
55	28.05	0.0099	24754.33
56	28.54	0.0129	32048.84
58	28.96	0.0031	7769.75
59	29.03	0.0163	40653.29
61	29.56	0.0073	18269.23
	29.82	0.0085	21051.64
	29.91	0.0200	49878.56
	30.06	0.0078	19466.99
62	30.76	0.0063	15692.76
I.S. #2	30.94	0.6752	1680630.00
	31.11	0.0223	55600.31
	31.29	0.0078	19398.79
63	31.52	0.0034	8550.83
	31.79	0.0157	39168.89
	31.89	0.0163	40656.60
64	31.97	0.0132	32852.92
	32.19	0.0112	27801.89
	32.40	0.0142	35452.20
	32.52	0.0278	69170.05
	32.64	0.0134	33436.81
65	32.74	0.0100	24971.94
	32.94	0.0414	103133.30
	33.03	0.0085	21155.77
66	33.39	0.0586	145967.00
68	33.92	0.0161	40091.71
69	34.20	0.0726	180647.60
	34.34	0.0079	19723.72
	34.56	0.0478	119032.40
71	34.81	0.0122	30379.83
	34.91	0.0185	46081.44
	35.16	0.0497	123659.00
	35.35	0.0241	59953.70
72	35.53	0.0073	18094.93
73	35.67	0.1017	253175.00
	35.75	0.0397	98779.18
	35.85	0.0234	58160.29
	35.93	0.0364	90697.07
	36.11	0.0169	41990.85
74	36.43	0.0139	34520.47
75	36.54	0.0153	38152.85

Peak Name	Ret. Time	Area %	Area
76	36.72	0.0294	73156.23
	36.90	0.0056	13842.89
	37.11	0.0150	37289.09
77	37.24	0.0349	86894.72
	37.37	0.0222	55207.90
	37.48	0.0195	48508.73
	37.57	0.0375	93292.24
78	37.88	0.0942	234361.50
	38.08	0.1463	364119.10
	38.21	0.0220	54662.08
	38.36	0.0544	135371.60
	38.47	0.0706	175639.70
	38.66	0.0381	94819.53
	38.72	0.0350	87031.24
	38.78	0.0353	87855.15
79	38.95	0.0785	195436.30
	39.13	0.0177	44054.67
80	39.30	0.0311	77286.57
	39.38	0.0129	32092.05
	39.64	0.0221	54931.69
81	39.72	0.1020	253820.80
82	39.92	0.0355	88327.59
	40.08	0.0226	56271.84
83	40.32	0.0913	227252.90
84	40.42	0.1145	284953.50
	40.63	0.0148	36823.93
85	40.74	0.2160	537502.30
	40.85	0.0177	43978.27
	40.95	0.0518	128999.40
	41.07	0.0593	147551.00
	41.18	0.0680	169133.30
	41.36	0.0829	206270.00
	41.57	0.0516	128516.30
	41.69	0.0578	143825.80
	41.82	0.0801	199433.10
	42.03	0.0681	169519.60
	42.17	0.0416	103426.90
	42.24	0.0599	149130.00
	42.35	0.0258	64268.03
87	42.46	0.1497	372539.60
	42.56	0.0459	114364.60
88	42.64	0.1647	409965.00
	42.79	0.1285	319838.70
	42.87	0.0218	54366.76
	42.97	0.0285	70939.84
	43.08	0.1149	286014.50
	43.23	0.0139	34525.45
	43.32	0.0106	26364.16
	43.52	0.1598	397775.70
	43.63	0.2034	506291.50
	43.73	0.0538	133832.60
	43.80	0.0342	85148.41
	43.95	0.1601	398488.20
	44.04	0.1542	383712.30
89	44.25	0.1927	479708.20
	44.46	0.0813	202364.00
	44.57	0.0671	167070.90
	44.72	0.1349	335821.40
	44.85	0.0272	67605.62
	44.94	0.0896	222967.00
	45.02	0.0678	168689.10
	45.12	0.0117	29099.60
	45.26	0.0668	166314.00
	45.38	0.0825	205309.20
90	45.53	0.1441	358759.10
	45.64	0.0478	118901.60
	45.78	0.0605	150680.80

Peak Name	Ret. Time	Area %	Area
	45.88	0.0274	68313.21
	45.99	0.1699	422951.50
	46.07	0.1706	424632.80
	46.27	0.1569	390552.60
	46.33	0.0814	202538.20
	46.43	0.1768	439977.90
	46.50	0.1915	476584.60
	46.57	0.1029	256063.30
	46.72	0.1409	350608.60
	46.96	0.1401	348707.50
	47.20	0.2531	629882.90
	47.35	0.0705	175529.10
	47.49	0.1008	250780.00
	47.55	0.0580	144381.20
i-C13	47.67	0.4661	1160053.00
	47.81	0.0189	46983.03
	47.88	0.0920	229012.40
	47.97	0.1641	408514.10
	48.11	0.1353	336858.80
	48.23	0.2526	628686.40
	48.40	0.2046	509290.00
	48.59	0.4545	1131114.00
	48.69	0.1026	255416.50
	48.84	0.0885	220295.90
	48.94	0.1638	407670.30
	49.10	0.6069	1510623.00
	49.34	0.1583	393910.60
	49.47	0.1183	294358.60
	49.54	0.4343	1080946.00
	49.74	0.3236	805494.80
i-C14	49.85	0.6817	1696634.00
	49.93	0.1743	433792.70
91	50.05	1.4442	3594441.00
	50.16	0.2576	641043.70
	50.25	0.2693	670294.70
	50.38	0.2151	535467.00
	50.46	0.2278	567016.40
92	50.57	1.2822	3191182.00
	50.73	0.2485	618462.70
	50.83	0.1511	376047.20
	50.93	0.3018	751182.20
	51.02	0.6433	1601154.00
	51.22	0.6500	1617868.00
	51.39	0.2411	600051.40
	51.47	0.1288	320542.10
	51.53	0.4952	1232463.00
	51.69	0.3659	910708.20
	51.75	0.2682	667574.80
	51.90	0.2041	507936.80
	51.96	0.6574	1636202.00
	52.12	0.3359	836118.20
	52.25	0.3711	923732.10
	52.36	0.2523	627894.10
	52.46	0.2352	585285.20
	52.54	0.6516	1621735.00
	52.68	0.3319	826129.90
	52.79	0.1826	454597.80
i-C15	52.89	1.1368	2829397.00
	52.98	1.0727	2669879.00
	53.09	1.1250	2800027.00
	53.35	2.7353	6807859.00
	53.53	0.7891	1963997.00
	53.69	2.6534	6604117.00
	53.78	1.8431	4587454.00
	53.90	0.4920	1224539.00
	54.07	0.5223	1300018.00
	54.17	1.6000	3982387.00

Peak Name	Ret. Time	Area %	Area
	54.31	0.4682	1165258.00
	54.41	0.9570	2381785.00
	54.51	0.9103	2265695.00
	54.60	0.9763	2429823.00
	54.78	0.3674	914382.20
i-C16	54.92	1.9019	4733622.00
	55.00	0.2343	583198.90
	55.05	0.5631	1401547.00
	55.14	0.5106	1270779.00
	55.24	0.9843	2449785.00
	55.34	0.5691	1416409.00
	55.43	0.3908	972607.00
	55.51	0.8327	2072622.00
	55.66	1.5680	3902721.00
	55.75	0.7646	1902932.00
	55.86	0.6589	1639905.00
	55.95	0.3756	934739.80
	56.01	0.6337	1577175.00
	56.13	1.1833	2945227.00
	56.25	1.6698	4156074.00
	56.35	0.2604	648169.40
	56.41	0.2782	692336.60
	56.56	1.2887	3207529.00
	56.66	1.2571	3128915.00
	56.79	0.6402	1593314.00
	56.87	0.5149	1281596.00
	56.96	1.9326	4810198.00
	57.23	1.3108	3262451.00
	57.38	0.4431	1102830.00
	57.48	1.0542	2623872.00
	57.57	1.2464	3102175.00
	57.73	1.0600	2638166.00
	57.89	0.5912	1471374.00
	57.97	0.7672	1909619.00
	58.06	0.4459	1109768.00
	58.13	0.5858	1457971.00
	58.25	0.5448	1355906.00
	58.37	0.7230	1799434.00
i-C18	58.51	2.1524	5357100.00
	58.69	0.5598	1393344.00
	58.81	0.4525	1126169.00
	58.91	0.5832	1451605.00
	59.00	0.2613	650476.90
	59.06	0.2253	560849.90
	59.19	0.8154	2029567.00
	59.26	0.5849	1455653.00
	59.38	0.6382	1588465.00
Pristane	59.49	3.1451	7827942.00
	59.56	1.1414	2840965.00
	59.71	0.8333	2073899.00
	59.87	0.5398	1343599.00
	59.95	1.1592	2885179.00
	60.13	0.2913	724950.40
	60.19	0.6042	1503758.00
	60.39	1.1965	2978103.00
	60.57	0.6211	1545857.00
	60.72	1.2227	3043138.00
	60.99	0.4095	1019282.00
Phytane	61.08	1.4875	3702269.00
	61.25	0.4168	1037504.00
	61.39	0.6351	1580712.00
	61.46	0.6067	1510011.00
	61.59	0.2207	549348.30
	61.66	0.5575	1387614.00
	61.81	0.4240	1055336.00
	61.94	0.3157	785743.00
	62.04	0.3849	958093.90

Peak Name	Ret. Time	Area %	Area
	62.14	0.2896	720852.90
	62.25	0.7187	1788766.00
	62.47	0.6547	1629380.00
	62.56	0.5579	1388685.00
	62.71	0.3069	763911.60
	62.84	0.3245	807726.90
	62.92	0.3262	811997.30
	63.06	0.6085	1514499.00
	63.36	0.2990	744073.10
	63.46	0.1458	362950.50
	63.53	0.1106	275330.20
	63.64	0.2059	512593.30
	63.76	0.0811	201825.90
	63.83	0.1363	339199.80
	63.93	0.1004	249955.00
	64.02	0.2024	503869.80
	64.16	0.4399	1094936.00
	64.41	0.3701	921139.80
	64.51	0.2247	559144.80
IS #3	64.58	0.2269	564711.20
	64.67	0.2106	524187.10
	64.81	0.0048	11868.38
	64.97	0.0672	167304.10
	65.16	0.1108	275762.40
	65.36	0.0957	238092.10
	65.45	0.0295	73474.48
	65.54	0.2241	557690.10
	65.81	0.1951	485698.30
	65.96	0.1841	458198.50
	66.08	0.0618	153775.80
	66.19	0.1054	262242.50
	66.27	0.0603	150097.30
	66.34	0.0711	177022.60
	66.45	0.0256	63680.11
	66.53	0.0521	129641.40
	66.62	0.0949	236243.90
	66.88	0.0437	108814.20
	67.00	0.0392	97635.71
	67.05	0.0385	95887.55
	67.10	0.0481	119695.60
	67.21	0.0428	106576.50
	67.37	0.0374	93206.55
	67.46	0.0361	89888.99
	67.53	0.0234	58228.71
	67.66	0.0147	36517.49
	67.80	0.0369	91856.49
	68.04	0.0111	27538.46
	68.17	0.0141	35122.26
	68.45	0.0078	19290.99
	68.55	0.0144	35800.96
	68.67	0.0075	18625.68
	68.81	0.0097	24178.17
	68.92	0.0105	26239.35
	69.74	0.0055	13719.01

Total Area = 2.488924E+08 Total Height = 6.402477E+07 Total Amount = 3

6/10/2015

ZymaX ID	15714-2
Sample ID	SEEP-A

Evaporation

n-Pentane / n-Heptane	0.76
2-Methylpentane / 2-Methylheptane	1.15

Waterwashing

Benzene / Cyclohexane	12.93
Toluene / Methylcyclohexane	108.29
Aromatics / Total Paraffins (n+iso+cyc)	1.64
Aromatics / Naphthenes	27.66

Biodegradation

(C4 - C8 Para + Isopara) / C4 - C8 Olefins	20.66
3-Methylhexane / n-Heptane	1.37
Methylcyclohexane / n-Heptane	0.36
Isoparaffins + Naphthenes / Paraffins	12.29

Octane rating

2,2,4,-Trimethylpentane / Methylcyclohexane	39.62

Relative percentages - Bulk hydrocarbon composition as PIANO

% Paraffinic	2.79
% Isoparaffinic	32.12
% Aromatic	61.06
% Naphthenic	2.21
% Olefinic	1.81

6/10/2015

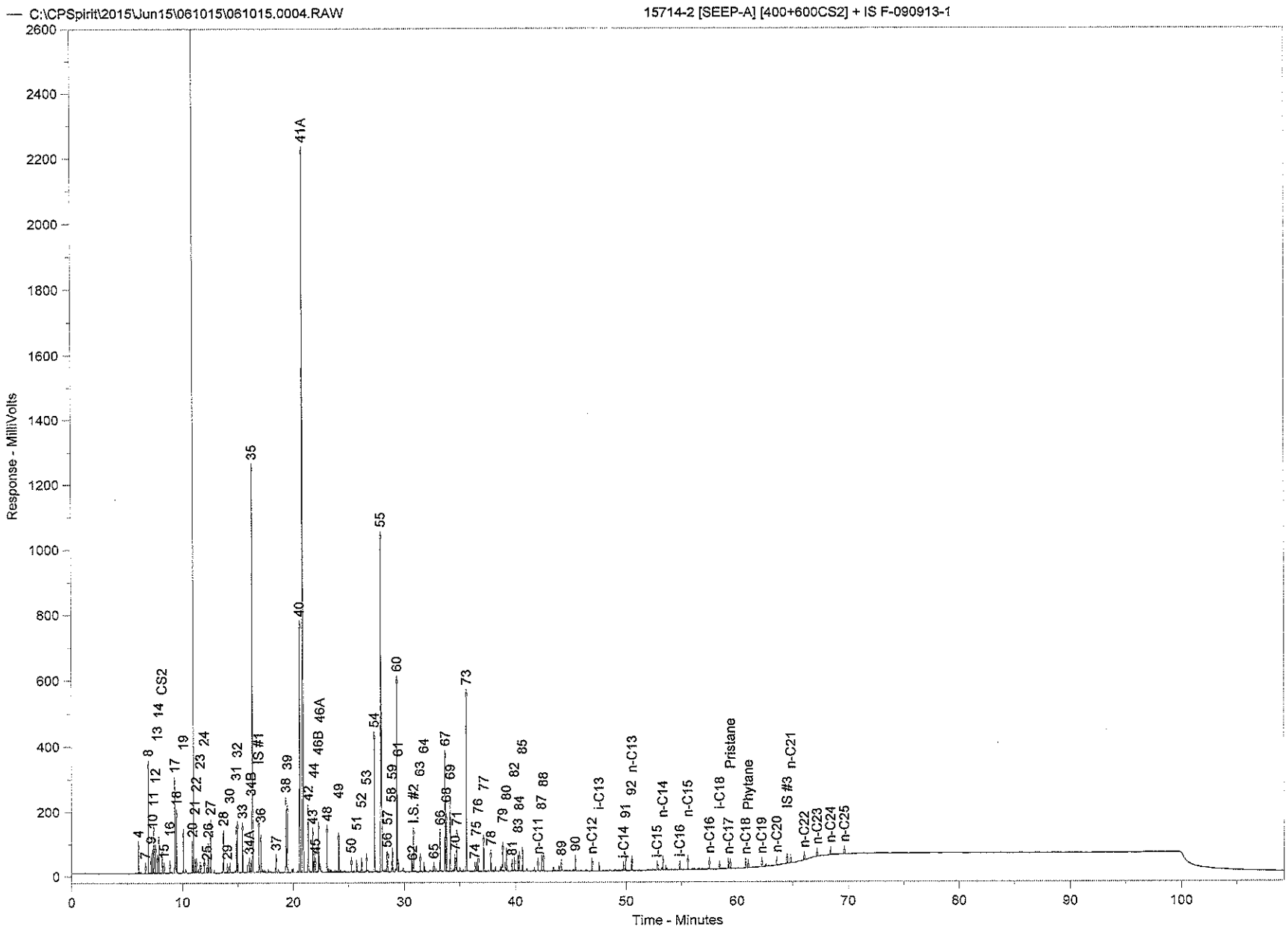
ZymaX ID		15714-2
Sample ID		SEEP-A
		Relative Area %
1	Propane	0.00
2	Isobutane	0.00
3	Isobutene	0.00
4	Butane/Methanol	0.23
5	trans-2-Butene	0.00
6	cis-2-Butene	0.00
7	3-Methyl-1-butene	0.03
8	Isopentane	1.17
9	1-Pentene	0.10
10	2-Methyl-1-butene	0.19
11	Pentane	0.50
12	trans-2-Pentene	0.26
13	cis-2-Pentene/t-Butanol	0.15
14	2-Methyl-2-butene	0.41
15	2,2-Dimethylbutane	0.04
16	Cyclopentane	0.06
17	2,3-Dimethylbutane/MTBE	1.69
18	2-Methylpentane	0.94
19	3-Methylpentane	0.62
20	Hexane	0.45
21	trans-2-Hexene	0.12
22	3-Methylcyclopentene	0.13
23	3-Methyl-2-pentene	0.07
24	cis-2-Hexene	0.13
25	3-Methyl-trans-2-pentene	0.03
26	Methylcyclopentane	0.42
27	2,4-Dimethylpentane	0.92
28	Benzene	0.81
29	5-Methyl-1-hexene	0.05
30	Cyclohexane	0.06
31	2-Methylhexane/TAME	0.83
32	2,3-Dimethylpentane	0.95
33	3-Methylhexane	0.90
34A	1-trans-3-Dimethylcyclopentane	0.15
34B	1-cis-3-Dimethylcyclopentane	0.13
35	2,2,4-Trimethylpentane	9.36
I.S. #1	à,à,à-Trifluorotoluene	0.00

6/10/2015

ZymaX ID		15714-2
Sample ID		SEEP-A
		Relative Area %
36	n-Heptane	0.66
37	Methylcyclohexane	0.24
38	2,5-Dimethylhexane	1.51
39	2,4-Dimethylhexane	1.39
40	2,3,4-Trimethylpentane	6.03
41	Toluene/2,3,3-Trimethylpentane	25.58
42	2,3-Dimethylhexane	1.37
43	2-Methylheptane	0.81
44	4-Methylheptane	0.37
45	3,4-Dimethylhexane	0.30
46A	3-Ethyl-3-methylpentane	0.00
46B	1,4-Dimethylcyclohexane	0.94
47	3-Methylheptane	0.00
48	2,2,5-Trimethylhexane	0.93
49	n-Octane	0.73
50	2,2-Dimethylheptane	0.18
51	2,4-Dimethylheptane	0.10
52	Ethylcyclohexane	0.20
53	2,6-Dimethylheptane	0.25
54	Ethylbenzene	2.91
55	m+p Xylenes	12.29
56	4-Methyloctane	0.30
57	2-Methyloctane	0.31
58	3-Ethylheptane	0.08
59	3-Methyloctane	0.38
60	o-Xylene	4.16
61	1-Nonene	0.13
62	n-Nonane	0.00
I.S.#2	p-Bromofluorobenzene	0.00
63	Isopropylbenzene	0.25
64	3,3,5-Trimethylheptane	0.04
65	2,4,5-Trimethylheptane	0.04
66	n-Propylbenzene	0.81
67	1-Methyl-3-ethylbenzene	2.52
68	1-Methyl-4-ethylbenzene	1.11
69	1,3,5-Trimethylbenzene	1.54
70	3,3,4-Trimethylheptane	0.31

6/10/2015

ZymaX ID		15714-2
Sample ID		SEEP-A
		Relative Area %
71	1-Methyl-2-ethylbenzene	0.76
72	3-Methylnonane	0.00
73	1,2,4-Trimethylbenzene	3.96
74	Isobutylbenzene	0.04
75	sec-Butylbenzene	0.07
76	n-Decane	0.21
77	1,2,3-Trimethylbenzene	0.71
78	Indan	0.33
79	1,3-Diethylbenzene	0.54
80	1,4-Diethylbenzene	0.36
81	n-Butylbenzene	0.13
82	1,3-Dimethyl-5-ethylbenzene	0.22
83	1,4-Dimethyl-2-ethylbenzene	0.23
84	1,3-Dimethyl-4-ethylbenzene	0.32
85	1,2-Dimethyl-4-ethylbenzene	0.39
86	Undecene	0.00
87	1,2,4,5-Tetramethylbenzene	0.20
88	1,2,3,5-Tetramethylbenzene	0.27
89	1,2,3,4-Tetramethylbenzene	0.08
90	Naphthalene	0.20
91	2-Methyl-naphthalene	0.18
92	1-Methyl-naphthalene	0.09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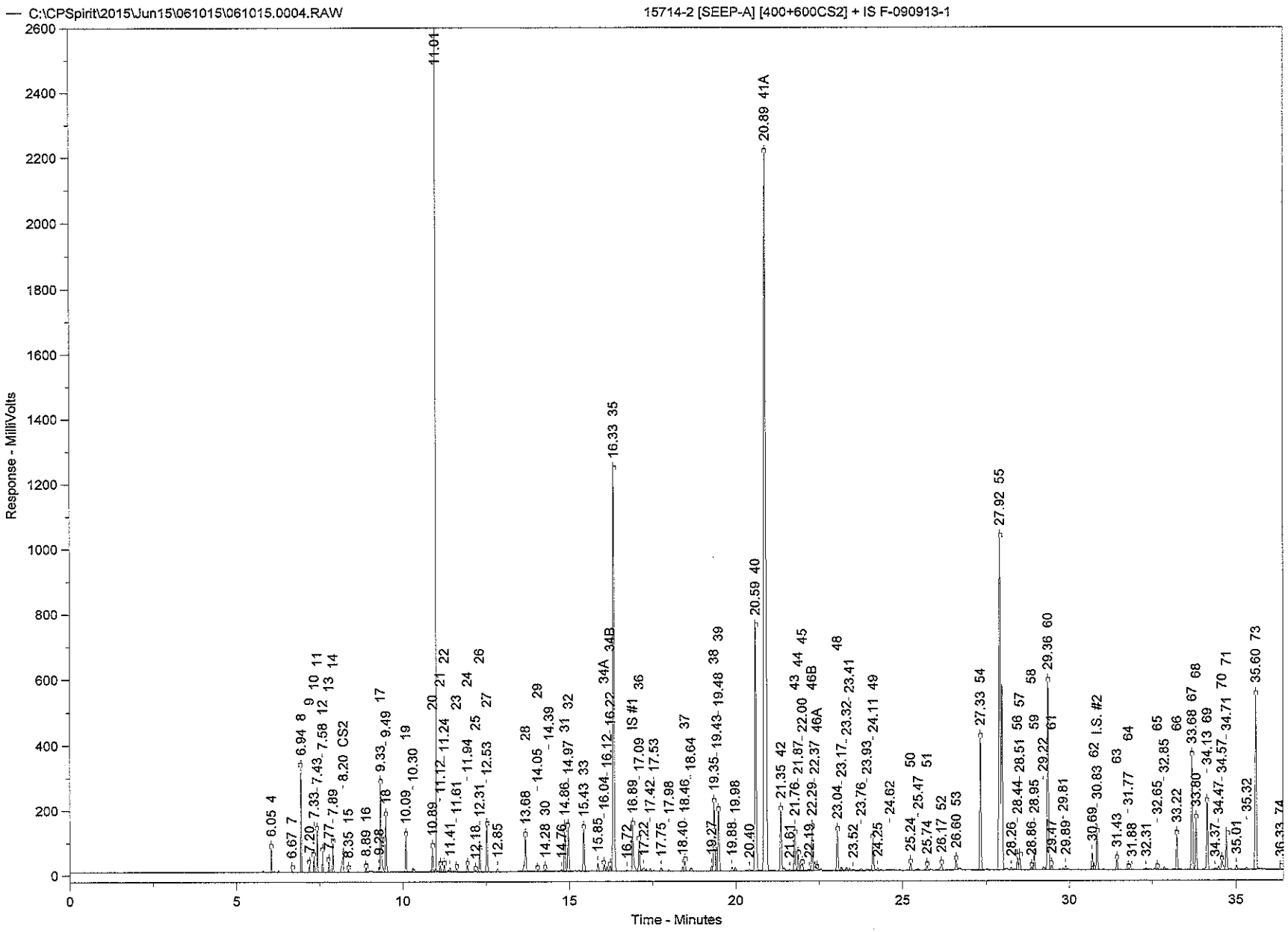
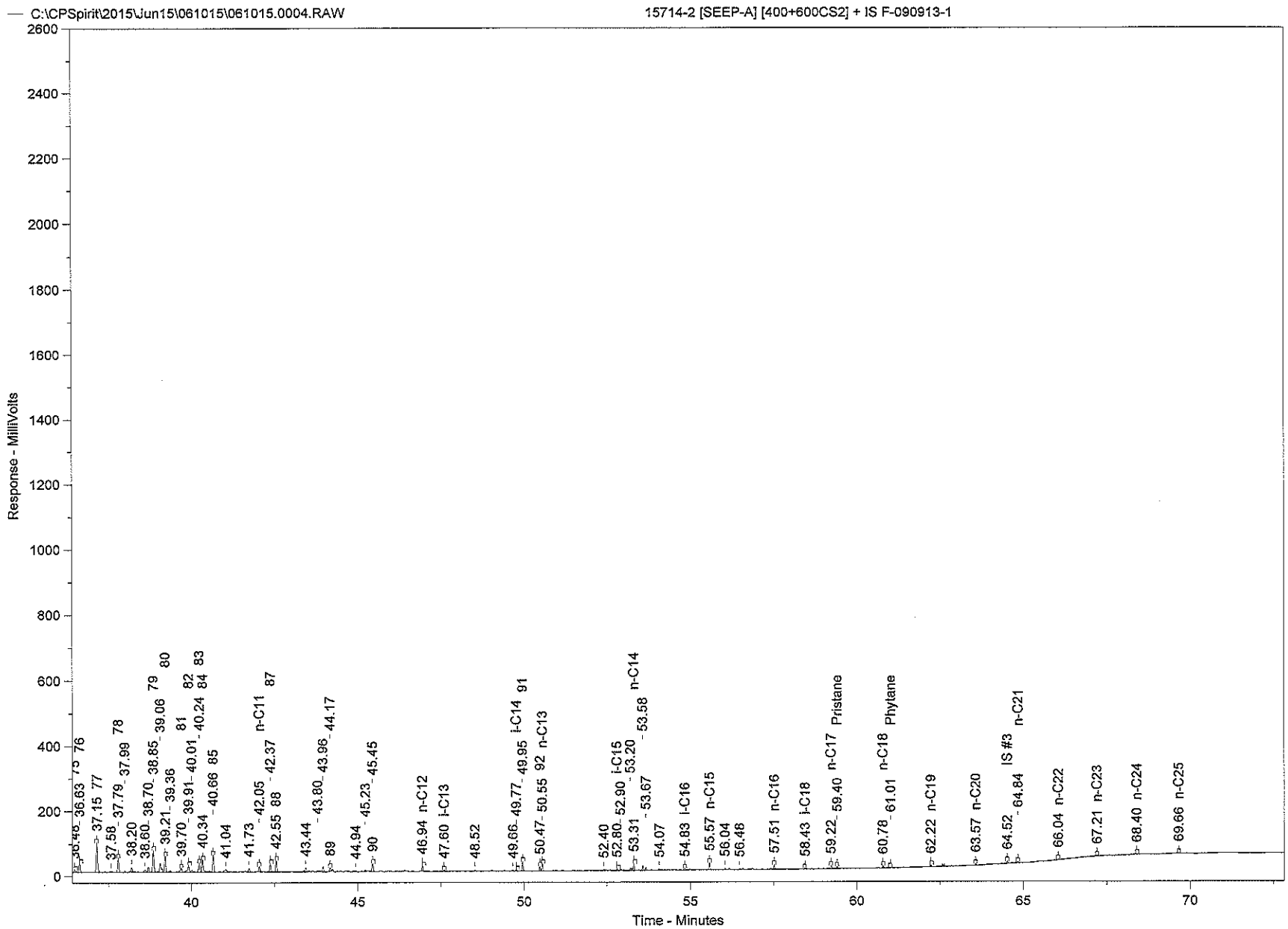
15714-2 [SEEP-A] [400+600CS2] + IS F-090913-1
Response - MilliVolts
Time - Minutes
CS2
IS #1
I.S. #2
IS #3
i-C12
i-C13
i-C14
i-C15
i-C16
i-C18
n-C11
n-C13
n-C14
n-C15
n-C16
n-C17
n-C18
n-C20
n-C21
n-C22
n-C23
n-C24
n-C25
Pristane
Phytane


C:\CPSpirit\2015\Jun15\061015\061015.0004.RAW
15714-2 [SEEP-A] [400+600CS2] + IS F-090913-1
Response - MilliVolts
Time - Minutes
11.01
20.89 41A
16.33 35
27.92 55
20.59 40
6.05 4
6.67 7
6.94 8
7.20 9
7.33 10
7.43 11
7.58 12
7.77 13
7.89 14
8.20 CS2
8.35 15
8.89 16
9.33 17
9.49 18
10.09 19
10.30
10.89 20
11.12 21
11.24 22
11.41 23
11.61
11.94 24
12.18 25
12.31 26
12.53 27
12.85
13.68 28
14.05 29
14.28 30
14.39 31
14.76 32
14.86
14.97 33
15.43
15.85
16.04
16.12
16.22 34A
34B
16.72
16.89 IS #1 36
17.09
17.22
17.42 17.53
17.75
17.98
18.40
18.46
18.64 37
19.27
19.35
19.43 38
19.48 39
19.88
19.98
20.40
21.35 42
21.61
21.76
21.87 43
22.00 44
45
46B
22.19
22.29
22.37 46A
23.04
23.17
23.32 48
23.41
23.52
23.76
23.93 49
24.11
24.25
24.62
25.24
25.47 50
25.74
26.17 51
26.60 52
26.60 53
27.33 54
28.26
28.44
28.51 56
57
58
28.86
28.95
29.22 59
29.36 60
29.47
29.81
29.89
30.69
30.83 62
I.S. #2
31.43
31.77 63
31.88
64
32.31
32.65
32.85 65
33.22
66
33.68 67
68
33.80
34.13 69
34.37
34.47
34.57
34.71 70
71
35.01
35.32
35.60 73
36.33 74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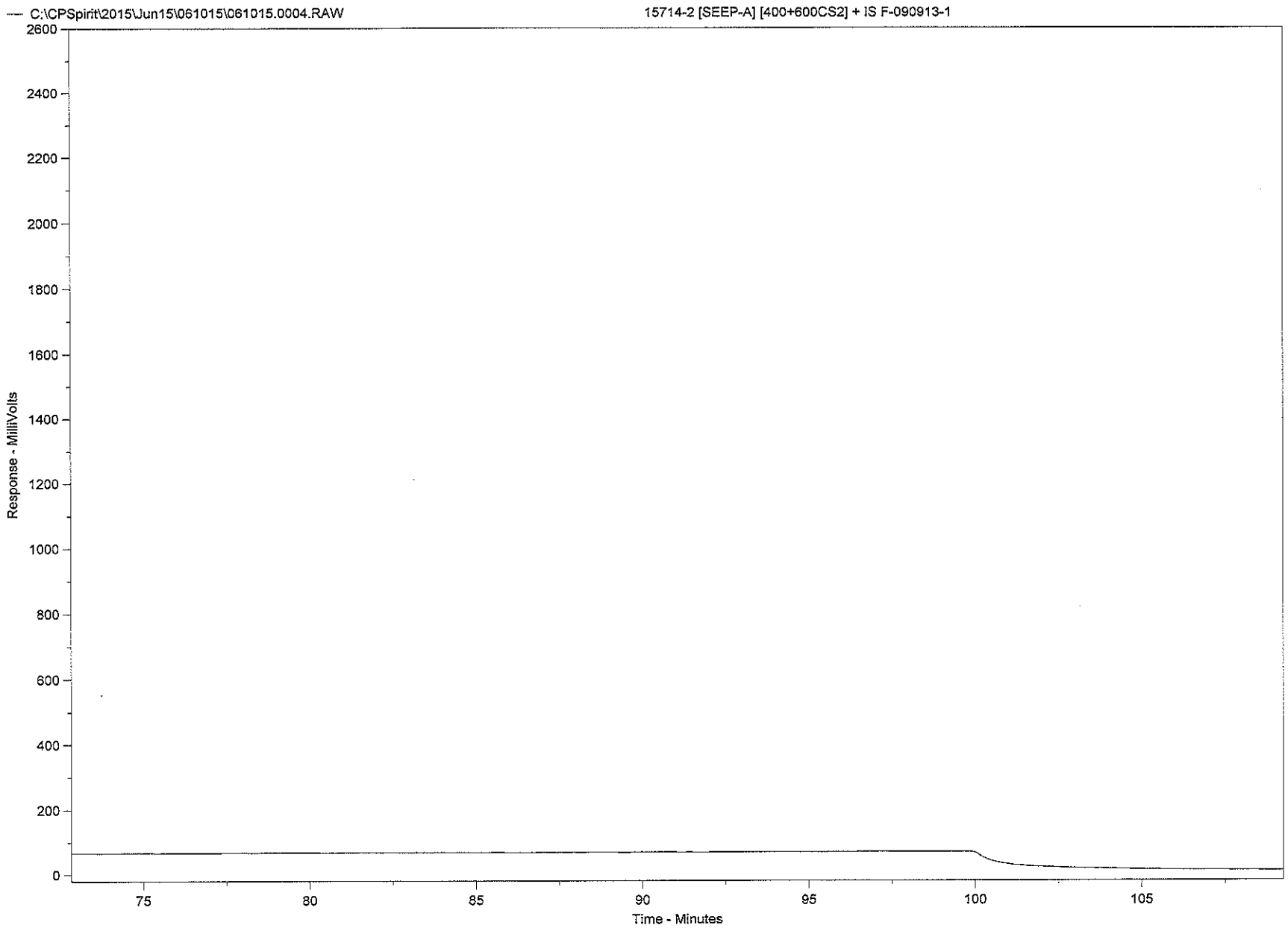
15714-2 [SEEP-A] [400+600CS2] + IS F-090913-1
Response - MilliVolts
Time - Minutes
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
40
45
50
55
60
65
70
36.63
37.15
37.58
37.79
37.99
38.20
38.60
38.70
38.85
39.06
39.21
39.36
39.70
39.91
40.01
40.24
40.34
40.66
41.04
41.73
42.05
n-C11
42.37
42.55
43.44
43.80
43.96
44.17
44.94
45.23
45.45
46.94
n-C12
47.60
i-C13
48.52
49.66
49.77
49.95
i-C14
50.47
50.55
n-C13
52.40
52.80
52.90
i-C15
53.20
53.31
53.58
n-C14
53.67
54.07
54.83
i-C16
55.57
n-C15
56.04
56.48
57.51
n-C16
58.43
i-C18
59.22
59.40
n-C17
Pristane
60.78
61.01
n-C18
Phytane
62.22
n-C19
63.57
n-C20
64.52
64.84
IS #3
n-C21
66.04
n-C22
67.21
n-C23
68.40
n-C24
69.66
n-C25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15714-2 [SEEP-A] [400+600CS2] + IS F-090913-1
Response - MilliVolts
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
75
80
85
90
95
100
105
Time - Minutes

Sample Name = 15714-2 [SEEP-A] [400+600CS2] + IS F-090913-1

Instrument = Instrument 1
Heading 1 =
Heading 2 =

Acquisition Port = DP#

Raw File Name = C:\CPSpirit\2015\Jun15\061015\061015.0004.RAW
Method File Name = C:\CPSpirit\C344.met
Calibration File Name = C:\CPSpirit\061615.cal

Date Taken (end) = 6/12/2015 7:42:45 PM
Method Version = 44
Calibration Version = 3

Peak Name	Ret. Time	Area %	Area
4	6.05	0.1667	83356.52
7	6.67	0.0224	11198.88
8	6.94	0.8389	419552.80
9	7.20	0.0706	35322.25
10	7.33	0.1393	69670.34
11	7.43	0.3602	180147.60
12	7.58	0.1890	94511.37
13	7.77	0.1098	54902.52
14	7.89	0.2982	149138.40
CS2	8.20	0.3610	180522.00
15	8.35	0.0316	15814.32
16	8.89	0.0467	23371.21
	9.28	0.0602	30107.04
17	9.33	1.2133	606812.30
18	9.49	0.6736	336858.90
19	10.09	0.4484	224258.50
	10.30	0.0828	41398.91
20	10.89	0.3269	163503.90
	11.01	21.2140	10609460.00
21	11.12	0.0851	42545.59
22	11.24	0.0903	45164.43
	11.41	0.0811	40545.14
23	11.61	0.0486	24312.76
24	11.94	0.0945	47274.08
25	12.18	0.0215	10735.39
26	12.31	0.3042	152153.30
27	12.53	0.6614	330756.10
	12.85	0.0461	23056.85
28	13.68	0.5844	292258.60
29	14.05	0.0387	19360.19
30	14.28	0.0452	22600.00
	14.39	0.0157	7863.31
	14.76	0.0355	17767.61
31	14.86	0.5951	297607.70
32	14.97	0.6805	340340.70
33	15.43	0.6472	323654.30
	15.85	0.1220	61027.56
34A	16.04	0.1105	55250.84
	16.12	0.0830	41493.30
34B	16.22	0.0905	45243.96
35	16.33	6.7310	3366267.00
	16.72	0.0276	13811.83
IS #1	16.89	0.8008	400490.00
36	17.09	0.4737	236929.00
	17.22	0.0922	46088.99
	17.42	0.0419	20945.26
	17.53	0.0205	10234.46
	17.75	0.0719	35948.32
	17.98	0.0339	16948.02
	18.40	0.0719	35946.06
37	18.46	0.1699	84956.11
	18.64	0.0849	42438.91
	19.27	0.0799	39973.79
38	19.35	1.0875	543877.30
	19.43	0.3486	174346.10

Peak Name	Ret. Time	Area %	Area
39	19.48	1.0017	500983.10
	19.88	0.0597	29847.26
	19.98	0.0598	29910.35
	20.40	0.0469	23452.51
40	20.59	4.3396	2170307.00
41A	20.89	18.3963	9200243.00
42	21.35	0.9837	491974.70
	21.61	0.0233	11656.96
43	21.76	0.5854	292781.20
44	21.87	0.2646	132305.60
45	22.00	0.2137	106861.00
	22.19	0.0381	19063.21
46B	22.29	0.6747	337431.10
	22.37	0.2147	107384.70
48	23.04	0.6656	332886.70
	23.17	0.0637	31873.34
	23.32	0.0519	25949.51
	23.41	0.0409	20454.30
	23.52	0.0242	12088.82
	23.76	0.0391	19550.37
	23.93	0.0480	23989.47
49	24.11	0.5273	263729.80
	24.25	0.0454	22707.55
	24.62	0.0222	11080.28
50	25.24	0.1314	65693.02
	25.47	0.0532	26624.04
51	25.74	0.0736	36819.62
52	26.17	0.1460	73018.06
53	26.60	0.1788	89428.39
54	27.33	2.0937	1047079.00
55	27.92	8.8380	4420020.00
	28.26	0.0409	20437.33
56	28.44	0.2124	106246.60
57	28.51	0.2210	110530.10
58	28.86	0.0603	30144.93
59	28.95	0.2747	137387.20
	29.22	0.0827	41377.15
60	29.36	2.9948	1497741.00
61	29.47	0.0954	47687.93
	29.81	0.0267	13351.83
	29.89	0.0565	28277.75
	30.69	0.2788	139425.00
I.S. #2	30.83	0.5802	290168.00
63	31.43	0.1790	89542.41
64	31.77	0.0292	14607.91
	31.88	0.0277	13837.44
	32.31	0.0291	14578.35
65	32.65	0.0295	14743.70
	32.85	0.0405	20245.94
66	33.22	0.5825	291321.60
67	33.68	1.8140	907214.00
68	33.80	0.7961	398134.20
69	34.13	1.1073	553764.30
	34.37	0.0275	13775.10
	34.47	0.0581	29035.47
70	34.57	0.2251	112568.90
71	34.71	0.5451	272602.50
	35.01	0.0767	38339.88
	35.32	0.0462	23089.32
73	35.60	2.8470	1423812.00
74	36.33	0.0306	15316.91
75	36.48	0.0539	26934.32
76	36.63	0.1541	77090.95
77	37.15	0.5079	253994.60
	37.58	0.0222	11082.38
78	37.79	0.2371	118555.60
	37.99	0.0255	12738.97

Peak Name	Ret. Time	Area %	Area
	38.20	0.0709	35471.53
	38.60	0.0504	25208.97
	38.70	0.0901	45063.50
79	38.85	0.3873	193680.80
	39.06	0.2159	107956.30
80	39.21	0.2624	131211.20
	39.36	0.0280	13989.86
81	39.70	0.0924	46200.75
82	39.91	0.1548	77421.12
	40.01	0.0424	21183.87
83	40.24	0.1671	83560.45
84	40.34	0.2309	115482.80
85	40.66	0.2778	138917.90
	41.04	0.0876	43803.00
	41.73	0.0590	29496.82
n-C11	42.05	0.0907	45339.41
87	42.37	0.1413	70683.75
88	42.55	0.1957	97861.34
	43.44	0.0810	40487.03
	43.80	0.0390	19502.14
	43.96	0.0860	42989.09
89	44.17	0.0557	27835.03
	44.94	0.0413	20673.12
	45.23	0.0253	12643.21
90	45.45	0.1467	73360.59
n-C12	46.94	0.0841	42072.24
i-C13	47.60	0.0269	13437.53
	48.52	0.0272	13584.97
	49.66	0.0255	12755.75
i-C14	49.77	0.0188	9424.51
91	49.95	0.1277	63860.62
92	50.47	0.0612	30600.01
n-C13	50.55	0.0930	46524.24
	52.40	0.0274	13708.70
i-C15	52.80	0.0205	10245.50
	52.90	0.0267	13337.53
	53.20	0.0640	31992.81
n-C14	53.31	0.0827	41372.24
	53.58	0.0639	31978.76
	53.67	0.0384	19216.12
	54.07	0.0293	14631.88
i-C16	54.83	0.0286	14305.06
n-C15	55.57	0.0863	43182.60
	56.04	0.0167	8329.35
	56.48	0.0121	6055.42
n-C16	57.51	0.0606	30314.61
i-C18	58.43	0.0159	7934.35
n-C17	59.22	0.0442	22087.17
Pristane	59.40	0.0304	15192.57
n-C18	60.78	0.0253	12668.24
Phytane	61.01	0.0070	3504.86
n-C19	62.22	0.0215	10777.29
n-C20	63.57	0.0160	7980.08
IS #3	64.52	0.0284	14220.05
n-C21	64.84	0.0144	7179.26
n-C22	66.04	0.0095	4765.55
n-C23	67.21	0.0065	3232.82
n-C24	68.40	0.0049	2456.57
n-C25	69.66	0.0031	1542.91

Total Area = 5.00115E+07 Total Height = 6.635798E+07 Total Amount = 0

REPORT OF ANALYTICAL RESULTS

Client:	**Jennifer Menges** **Stantec** **1060 Andrew Drive, Suite 140** **West Chester, PA 19380**
Project:	**Evergreen, Marcus Hook AOI 1**
Project Number:	**213402493**
Collected by:	**-**

Lab Number:	**15714**
Collected:	**4/6/2015**
Received:	**4/22/2015**
Matrix:	**Product**
Sample Description:	**See Below**
Analyzed:	**6/8/2015**
Method:	**ASTM D 1217**

SPECIFIC GRAVITY

LAB NUMBER	SAMPLE DESCRIPTION	SPECIFIC GRAVITY
15714-1	MW-523	0.884
15714-2	Seep-A	0.812

43953/
15714

Sample Condition Upon Receipt

Pace Analytical

Client Name: Stantec Project #

Courier: [X] Fed Ex [ ] UPS [ ] USPS [ ] Client [ ] Commercial [ ] Pace Other

Tracking #: 780493044414

Custody Seal on Cooler/Box Present: [ ] yes [X] no Seals intact: [ ] yes [ ] no Biological Tissue is Frozen: Yes No

Packing Material: Bubble Wrap X Bubble Bags ___ None ___ Other Foam

Thermometer Used #8 Type of Ice: Wet Blue None [ ] Samples on ice, cooling process has begun

Cooler Temp.: Observed Temp.: 5.5 °C Correction Factor: +0.1 °C Final Temp: 5.6 °C

Date and Initials of person examining contents: SRA 4-14-15

Temp should be above freezing to 6°C

		Comments:
Chain of Custody Present:	[X]Yes [ ]No [ ]N/A	1.
Chain of Custody Filled Out:	[X]Yes [ ]No [ ]N/A	2.
Chain of Custody Relinquished:	[X]Yes [ ]No [ ]N/A	3.
Sampler Name & Signature on COC:	[X]Yes [ ]No [ ]N/A	4.
Samples Arrived within Hold Time:	[X]Yes [ ]No [ ]N/A	5.
Short Hold Time Analysis (<72hr):	[ ]Yes [X]No [ ]N/A	6.
Rush Turn Around Time Requested:	[ ]Yes [X]No [ ]N/A	7.
Sufficient Volume:	[X]Yes [ ]No [ ]N/A	8.
Correct Containers Used:	[X]Yes [ ]No [ ]N/A	9.
-Pace Containers Used:	[ ]Yes [X]No [ ]N/A	
Containers Intact:	[X]Yes [ ]No [ ]N/A	10.
Filtered volume received for Dissolved tests	[ ]Yes [ ]No [X]N/A	11.
Sample Labels match COC:	[X]Yes [ ]No [ ]N/A	12.
-Includes date/time/ID/Analysis Matrix: O:1		
All containers needing preservation have been checked.	[ ]Yes [ ]No [X]N/A	13.
All containers needing preservation are found to be in compliance with EPA recommendation.	[ ]Yes [ ]No [X]N/A	
exceptions: VOA, coliform, TOC, O&G, Phenols	[ ]Yes [X]No	Initial when completed SRA / Lot # of added preservative
Samples checked for dechlorination:	[ ]Yes [ ]No [X]N/A	14.
Headspace in VOA Vials (>6mm):	[ ]Yes [ ]No [X]N/A	15.
Trip Blank Present:	[ ]Yes [X]No [ ]N/A	16.
Trip Blank Custody Seals Present	[ ]Yes [ ]No [X]N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution: Field Data Required? Y / N

Person Contacted: Date/Time:

Comments/ Resolution:

Project Manager Review: **Date:**

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)